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ABSTRACT

The actual record of births in the last fifteen years clearly indicates that the size of annual graduating classes from secondary schools will begin to decline by the end of this decade. Such a trend will be a significant environmental characteristic for the higher educational community, inasmuch as graduates from secondary schools comprise the principal source of demand for higher education. Because of the variations among geographical subdivisions in birth rates, migration, and anomalies in the grade-by-grade enrollment, the patterns of change for small geographical regions may be expected to vary from those on a state or nationwide basis. For the application under investigation, the number of graduates from public and private secondary schools in each of the sixty-seven counties in Pennsylvania were projected over a 10-year period by application of what is characteristically referred to as the cohort-survival method. Using enrollment data collected routinely by the Pennsylvania Department of Education, cohort-survival rates were computed for a number of historical years between each pair of grade-levels between one and graduation for primary and secondary school enrollments of each county. These rates were then applied to the most recently available compilations of grade-by-grade enrollment to generate projections of high school graduates for each county over the specified time horizon. (Author)

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PROJECTIONS OF HIGH SCHOOL GRADUATES BY COUNTY FOR PENNSYLVANIA 1973-1984

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Operations Research
Office of Budget and Planning
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I: PROJECTIONS OF HIGH SCHOOL GRADUATES

Throughout the 1960's and 1970's, the number of live births recorded nationwide in each successive year has exhibited a steady decline. Although it had been anticipated on the basis of population composition that the downward trend would be reversed or at least stabilized in the early 1970's, current indicators are at best mixed. However, regardless of whether the trend is now changing, the actual record of births in the last fifteen years clearly indicates that nationwide the size of the annual graduating classes from secondary schools will begin to decline after 1979. Such a trend will be a significant environmental characteristic for the higher educational community, inasmuch as graduates from secondary schools comprise the principal source of demand for higher education. Shown in Table I-1 are projections of high school graduates for the total U.S. from 1973 through 1984.

TABLE I-1

PROJECTIONS OF HIGH SCHOOL GRADUATES FOR U.S.[1]

Year	Graduates (000)
1973	3,137
1974	3,250
1975	3,331
1976	3,363
1977	3,390
1978	3,420
1979	3,427
1980	3,409
1981	3,378
1982	3,298
1983	3,152
1984	2,972

STATE-WIDE

Because of the net outward migration trends applicable to Pennsylvania, the peak in the number of secondary school graduates on a state-wide basis is projected to occur in 1975, several years before the similar phenomenum on a nationwide basis. Shown in Table I-2 are projections of high school graduates for Pennsylvania from 1973 through 1984.

TABLE I-2

PROJECTIONS OF HIGH SCHOOL GRADUATES FOR PENNSYLVANIA[2]

Year	Graduates
1973	182,400
1974	188,700
1975	193,700
1976	192,400
1977	190,200
1978	187,800
1979	187,400
1980	178,500
1981	175,200
1982	172,400
1983	164,000
1984	157,000

COUNTY

Because of variations among geographical subdivisions in birth rates, migration, and anomalies in the grade-by-grade enrollment, the patterns of change for individual counties within Pennsylvania may be expected to vary from those applicable on a state-wide basis. For this reason, projections have been developed of the number of secondary school graduates from both public and private institutions for each year from 1973 through 1984 for each of the sixty-seven counties in the Commonwealth, as shown in Table I-3. Although, like the state-wide projections, 1975 is the year in which the greatest frequency of peak graduates occurs among the counties, some exhibit a maximum as early as 1973 and others as late as 1982.

TABLE I-3

PROJECTIONS OF HIGH SCHOOL GRADUATES BY COUNTY

COUNTY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
ADAMS	1025	1018	1139	1074	1132	1057	1030	971	940	927	873	749
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
ARMSTRONG	1578	1527	1517	1533	1560	1428	1518	1467	1445	1427	1333	1375
BEAVER	3555	3841	3751	3813	3790	3687	3679	3463	3401	3292	3229	3042
BEDFORD	826	857	875	826	841	805	754	757	732	726	673	633
BERKS	4702	4917	4928	4873	4928	4995	5046	4964	5049	5000	4698	4621
BLAIR	2339	2566	2632	2651	2534	2660	2655	2480	2403	2406	2286	2192
BRADFORD	1074	1118	1193	1130	1169	1170	1269	1273	1162	1212	1103	1047
BUCKS	7827	8441	8660	8916	9124	9322	9532	9234	9309	9262	9188	9197
BUTLER	2126	2308	2393	2567	2541	2566	2768	2615	2629	2580	2606	2574
CAMBRIA	3541	3635	3777	3534	3376	3334	3216	3035	2988	3044	2999	2881
CAMERON	124	121	108	122	115	120	117	119	113	117	109	99
CARBON	646	723	743	710	697	715	680	706	721	739	724	659
CENTRE	1169	1209	1202	1172	1159	1123	1088	1055	1097	1141	1033	1016
CHESTER	4987	5204	5230	5432	5462	5322	5298	5189	5143	4977	4718	4670
CLARION	764	650	608	524	528	520	523	518	496	467	489	452
CLEARFIELD	1544	1664	1618	1649	1680	1683	1751	1804	1750	1804	1720	1785
CLINTON	592	552	650	633	631	630	598	532	544	554	504	478
COLUMBIA	1054	1001	1061	1011	1003	959	1024	925	956	987	897	907
CRAWFORD	996	1022	1012	1052	1056	1005	1045	1078	1051	1084	1103	1112
CUMBERLAND	3041	3171	3090	3237	3224	3299	3345	3242	3316	3423	3198	3024
DAUPHIN	3685	3782	3896	3957	4064	4112	4125	4062	3984	4054	3552	3747
DELAWARE	10674	11023	11310	10887	10896	10931	11633	10573	10387	10129	9365	8984
ELK	704	745	825	797	795	750	806	767	723	728	709	693
ERIE	4852	4954	5061	4894	4531	4491	4336	4248	4134	4105	4063	3926
FAYETTE	2614	2604	2815	2763	2786	2627	2613	2440	2340	2395	2356	2280
FOREST	79	82	80	98	98	83	91	104	107	99	92	100

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
FRANKLIN	1599	1536	1586	1610	1604	1633	1643	1633	1741	1699	1538	1455
FULTON	164	185	184	194	189	148	155	196	[illegible]	197	169	200
GREEN	543	580	602	556	520	501	616	621	528	578	556	587
HUNTINGDON	616	592	632	651	738	819	861	811	880	872	925	970
INDIANA	1323	1385	1319	1385	1390	1467	1497	1553	1540	1516	1508	1464
JEFFERSON	738	815	815	794	823	780	743	730	787	763	692	688
JUNIATA	263	275	265	279	267	275	271	280	294	265	244	272
LACKAWANNA	3634	3613	3716	3708	3634	3438	3519	3324	3261	3189	3096	3109
LANCASTER	4763	5055	6305	6543	6548	6569	6435	6171	6365	6145	5871	5610
LAWRENCE	1962	1968	1989	1946	2006	1998	1943	1820	1744	1749	1662	1680
LEBANON	1561	1598	1646	1563	1532	1531	1637	1680	1643	1642	1560	1432
LEHIGH	3472	3790	4341	4330	4145	4032	4365	4081	3980	4024	3733	3690
LUZERNE	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
LYCOMING	1812	1877	1933	2306	1796	1862	1862	1817	1759	1734	1606	1568
MC KEAN	989	949	966	901	889	929	870	795	793	777	823	735
MERCER	2206	2312	2298	2362	2137	2175	2117	1981	1956	1878	1832	1482
MIFFLIN	678	756	811	812	941	929	924	906	875	821	847	843
MONROE	643	735	743	798	805	797	813	778	744	771	777	718
MONTGOMERY	11125	11949	12020	11973	12260	11973	11780	11044	10716	10311	9558	8995
MONTOUR	236	253	280	276	325	318	275	274	310	264	268	278
NORTHAMPTON	3854	3756	3941	3848	3704	3630	3522	3420	3495	3614	3423	3466
NORTHUMBERLAND	1325	1513	1571	1514	1494	1452	1419	1351	1383	1356	1307	1283
PERRY	543	559	599	526	561	513	542	511	526	542	536	546
PHILADELPHIA	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
PIKE	112	134	148	150	156	165	171	208	144	134	118	131

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
POTTER	259	250	257	263	274	265	283	259	255	292	243	281
SCHUYLKILL	2448	2578	2536	2469	2443	2332	2369	2318	2289	2250	2187	2030
SNYDER	402	450	443	405	416	391	394	400	408	413	448	396
SOMERSET	1212	1341	1444	1370	1337	1355	1380	1342	1336	1353	1292	1249
SULLIVAN	97	113	113	90	110	106	86	91	84	72	77	70
SUSQUEHANNA	656	641	732	641	660	628	613	597	593	584	578	611
TIOGA	634	650	596	689	692	652	638	644	680	603	764	614
UNION	352	383	423	402	374	373	384	365	384	398	368	388
VENANGO	1257	1258	1281	1202	1163	1155	1126	1051	1016	903	891	821
WARREN	660	686	700	768	725	777	786	768	772	731	741	730
WASHINGTON	3655	3603	3765	3795	3625	3500	3493	3226	3208	3102	3069	2902
WAYNE	414	455	480	476	458	475	533	515	560	519	511	573
WESTMORELAND	6665	5565	5559	5536	5623	5492	5295	5114	4990	5081	4979	4783
WYOMING	357	314	364	375	316	397	414	423	417	445	461	463
YORK	4218	4346	4259	4391	4250	4401	4540	4335	4517	4393	4092	4013
TOTALS	182400	188700	193700	192400	190200	187800	187400	178500	175700	172400	164000	157000

COMMUTING REGION

Eighteen of the campuses of The Pennsylvania State University were developed to provide a means for students throughout Pennsylvania to pursue the first two years of study in higher education at a locality within commuting distance of their homes. Approximately three out of every four students enrolled in undergraduate degree programs collectively at what is now designated as Behrend College and the seventeen Commonwealth Campuses reside at home and commute to their respective campuses. Because of significance of commuting students to the size of the student body at these campuses, the projected sizes of the graduating classes from secondary schools within the commuting regions are of importance. Since the geographical region from which students commute to an institution of higher education is established by the time constraints of transportation to and from the campus, the boundaries of a commuting region are not likely to be altered significantly over time.

Shown in Table I-4 are projections of the number of high school graduates for each year from 1973 through 1984 from schools within the so-called primary commuting region associated with each of these eighteen campuses. In Table I-5 are projections for the so-called primary and secondary commuting regions on a combined basis. Those counties which provide 10% or more of the commuter enrollment to a campus are categorized as primary counties; those which supply less than 10% but more than 5% are categorized as secondary counties.(3) Six out of seven commuting students at these campuses reside in counties which are within the primary commuting region of one or more campuses. Thus the primary counties are of much greater significance to commuter-enrollment than those in the secondary regions.

TABLE I-4

PROJECTIONS OF HIGH SCHOOL GRADUATES
WITHIN PRIMARY COMMUTING REGION OF EACH COMMONWEALTH CAMPUS

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
ALLENTOWN												
LEHIGH	3472	3750	4341	4330	4145	4032	4365	4081	3980	4024	3733	3690
NORTHAMPTON	3854	3756	3941	3848	3704	3630	3522	3420	3495	3614	3423	3466
TOTALS	7326	7546	8282	8178	7849	7662	7887	7501	7475	7638	7156	7156
ALTOONA												
BLAIR	2339	2566	2632	2651	2534	2660	2655	2480	2403	2406	2286	2192
CAMBRIA	3541	3635	3777	3534	3376	3334	3216	3035	2988	3044	2999	2881
TOTALS	5880	6201	6409	6185	5910	5994	5871	5515	5391	5450	5285	5073
BEAVER												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
BEAVER	3555	3841	3751	3813	3790	3687	3679	3463	3401	3292	3229	3042
TOTALS	29019	29915	30083	29309	28594	27823	26865	24531	23614	22670	21189	19611
BEHREND												
ERIE	4852	4954	5061	4894	4531	4491	4336	4248	4134	4105	4063	3926
TOTALS	4852	4954	5061	4894	4531	4491	4336	4248	4134	4105	4063	3926
BERKS												
BERKS	4702	4917	4928	4873	4928	4995	5046	4964	5049	5000	4698	4621
TOTALS	4702	4917	4928	4873	4928	4995	5046	4964	5049	5000	4698	4621
DELAWARE												
DELAWARE	10674	11023	11310	10887	10896	10931	11633	10573	10387	10129	9365	8984
PHILADELPHIA	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
TOTALS	29568	31575	32499	31579	31364	30763	30756	28836	27829	26645	24700	22478
DUBOIS												
CLEARFIELD	1544	1664	1618	1649	1680	1683	1751	1804	1750	1804	1720	1785
ELK	704	745	825	797	795	750	806	767	723	728	709	693
JEFFERSON	738	819	815	794	823	780	743	730	787	763	692	688
TOTALS	2986	3228	3258	3240	3298	3213	3300	3301	3260	3295	3121	3166
FAYETTE												
FAYETTE	2614	2604	2815	2763	2786	2627	2613	2440	2340	2395	2356	2280
TOTALS	2614	2604	2815	2763	2786	2627	2613	2440	2340	2395	2356	2280
HAZLETON												
CARBON	646	723	743	710	697	715	680	706	721	739	724	659
LUZERNE	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
TOTALS	5126	5124	5082	5171	4973	4922	4891	4820	4708	4584	4458	4226
MCKEESPORT												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
TOTALS	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
MONT ALTO												
FRANKLIN	1599	1636	1586	1610	1604	1633	1643	1633	1741	1699	1538	1455
TOTALS	1599	1636	1586	1610	1604	1633	1643	1633	1741	1699	1538	1455
NEW KENSINGTON												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
WESTMORELAND	6665	5565	5559	5536	5623	5492	5295	5114	4990	5081	4979	4783
TOTALS	32129	31639	31891	31032	30427	29628	28481	26182	25203	24459	22939	21352
CONTZ												
PHILADELPHIA	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
TOTALS	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
SCHUYLKILL												
SCHUYLKILL	2448	2578	2536	2469	2443	2332	2389	2318	2289	2250	2187	2030
TOTALS	2448	2578	2536	2469	2443	2332	2389	2318	2289	2250	2187	2030
SHENANGO VALLEY												
LAWRENCE	1962	1968	1989	1946	2006	1998	1943	1820	1749	1749	1662	1680
MERCER	2206	2312	2298	2362	2137	2175	2117	1981	1956	1878	1832	1482
TOTALS	4168	4280	4287	4308	4143	4173	4060	3801	3700	3627	3494	3162
WILKES-BARRE												
LUZERNE	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
TOTALS	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
WORTHINGTON-SCRANTON												
LACKAWANNA	3634	3613	3716	3708	3634	3438	3519	3324	3261	3189	3096	3109
TOTALS	3634	3613	3716	3708	3634	3438	3519	3324	3261	3189	3096	3109
YORK												
YORK	4218	4346	4259	4391	4250	4401	4540	4335	4517	4393	4092	4013
TOTALS	4218	4346	4259	4391	4250	4401	4540	4335	4517	4393	4092	4013

TABLE I-5

PROJECTIONS OF HIGH SCHOOL GRADUATES
WITHIN PRIMARY & SECONDARY COMMUTING REGIONS OF EACH COMMONWEALTH CAMPUS

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
ALLENTOWN												
LEHIGH	3472	3790	4341	4330	4145	4032	4365	4081	3980	4024	3733	3690
NORTHAMPTON	3854	3756	3941	3848	3704	3630	3522	3420	3475	3614	3423	3466
BUCKS	7827	8441	8660	8916	9124	9322	9532	9234	9309	9262	9188	9197
TOTALS	15153	15987	16942	17094	16973	16984	17419	16735	16784	16900	16344	16353
ALTOONA												
BLAIR	2339	2566	2632	2651	2534	2660	2655	2480	2403	2406	2286	2192
CAMBRIA	3541	3635	3777	3534	3376	3334	3216	3035	2988	3044	2999	2881
TOTALS	5880	6201	6409	6185	5910	5994	5871	5515	5391	5450	5285	5073
BEAVER												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
BEAVER	3555	3841	3751	3813	3790	3687	3679	3463	3401	3292	3229	3042
TOTALS	29019	29915	30083	29309	28594	27823	26865	24531	23614	22670	21189	19611
BEHREND												
ERIE	4852	4954	5061	4894	4531	4491	4336	4248	4134	4105	4063	3926
TOTALS	4852	4954	5061	4894	4531	4491	4336	4248	4134	4105	4063	3926
BERKS												
BERKS	4702	4917	4928	4873	4928	4995	5046	4964	5049	5000	4698	4621
LEBANON	1561	1598	1646	1563	1532	1531	1637	1680	1643	1642	1560	1432
MONTGOMERY	11125	11949	12020	11973	12260	11973	11780	11044	10716	10311	9558	8995
TOTALS	17388	18464	18594	18409	18720	18499	18463	17688	17408	16953	15816	15048
DELAWARE												
DELAWARE	10674	11023	11310	10887	10896	10931	11633	10573	10387	10129	9365	8984
PHILADELPHIA	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
CHESTER	4987	5204	5230	5432	5462	5322	5298	5189	5143	4977	4718	4670
TOTALS	34555	36779	37729	37011	36826	36085	36054	34025	32972	31622	29418	27148
DUBOIS												
CLEARFIELD	1544	1664	1618	1649	1680	1683	1751	1804	1750	1804	1720	1785
ELK	704	745	825	797	795	750	806	767	723	728	709	693
JEFFERSON	738	819	815	794	823	780	743	730	787	763	692	688
TOTALS	2986	3228	3258	3240	3298	3213	3300	3301	3260	3295	3121	3166
FAYETTE												
FAYETTE	2614	2604	2815	2763	2786	2627	2613	2440	2340	2395	2356	2280
GREEN	543	580	602	556	520	501	616	621	528	578	556	587
WASHINGTON	3655	3603	3765	3795	3625	3500	3493	3226	3208	3102	3069	2902
WESTMORELAND	6665	5565	5559	5536	5623	5492	5295	5114	4990	5081	4979	4783
TOTALS	13477	12352	12741	12650	12554	12120	12017	11401	11066	11156	10960	10552
HAZLETON												
CARBON	646	723	743	710	697	715	680	706	721	739	724	659
LUZERNE	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
COLUMBIA	1054	1001	1061	1011	1003	959	1024	925	956	987	897	907
TOTALS	6180	6125	6143	6182	5976	5881	5915	5745	5664	5571	5355	5133
MCKEESPORT												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
WESTMORELAND	6665	5565	5559	5536	5623	5492	5295	5114	4990	5081	4979	4783
TOTALS	32129	31639	31891	31032	30427	29628	28481	26182	25203	24459	22939	21352
MONT ALTO												
FRANKLIN	1599	1636	1586	1610	1604	1633	1643	1633	1741	1699	1538	1455
ADAMS	1025	1018	1139	1074	1132	1057	1030	971	940	927	873	749
TOTALS	2624	2654	2725	2684	2736	2690	2673	2604	2681	2626	2411	2204
NEW KENSINGTON												
ALLEGHENY	25464	26074	26332	25496	24804	24136	23186	21068	20213	19378	17960	16569
WESTMORELAND	6665	5565	5559	5536	5623	5492	5295	5114	4990	5081	4979	4783
ARMSTRONG	1578	1527	1517	1533	1560	1428	1518	1467	1445	1427	1333	1375
TOTALS	33707	33166	33408	32565	31987	31056	29999	27649	26648	25886	24272	22727
OGONTZ												
PHILADELPHIA	18894	20552	21189	20692	20468	19832	19123	18263	17442	16516	15335	13494
BUCKS	7827	8441	8660	8916	9124	9322	9532	9234	9309	9262	9188	9197
MONTGOMERY	11125	11949	12020	11973	12260	11973	11780	11044	10716	10311	9558	8995
TOTALS	37846	40942	41869	41581	41852	41127	40435	38541	37467	36089	34081	31686
SCHUYLKILL												
SCHUYLKILL	2448	2578	2536	2469	2443	2332	2389	2318	2289	2250	2187	2030
NORTHUMBERLAND	1325	1513	1571	1514	1494	1452	1419	1351	1383	1356	1307	1283
TOTALS	3773	4091	4107	3983	3937	3784	3808	3669	3672	3606	3494	3313
SHENANGO VALLEY												
LAWRENCE	1962	1968	1989	1946	2006	1998	1943	1820	1744	1749	1662	1680
MERCER	2206	2312	2298	2362	2137	2175	2117	1981	1956	1878	1832	1482
TOTALS	4168	4280	4287	4308	4143	4173	4060	3801	3700	3627	3494	3162
WILKES-BARRE												
LUZERNE	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
TOTALS	4480	4401	4339	4461	4276	4207	4211	4114	3987	3845	3734	3567
WORTHINGTON-SCRANTON												
LACKAWANNA	3634	3613	3716	3708	3634	3438	3519	3324	3261	3189	3096	3109
TOTALS	3634	3613	3716	3708	3634	3438	3519	3324	3261	3189	3096	3109
YORK												
YORK	4219	4346	4259	4391	4250	4401	4540	4335	4517	4393	4092	4013
ADAMS	1025	1018	1139	1074	1132	1057	1030	971	940	927	873	749
CUMBERLAND	3041	3171	3090	3237	3224	3299	3345	3242	3316	3423	3198	3024
DAUPHIN	3685	3782	3896	3957	4064	4112	4125	4062	3984	4054	3552	3747
LANCASTER	4763	5059	6305	6543	6548	6569	6435	6171	6365	6145	5871	5610
TOTALS	16732	17376	18689	19202	19218	19438	19475	18781	19122	18942	17586	17143

II: METHODOLOGY

The technique employed for projecting the number of graduates from public and private secondary schools in each county of Pennsylvania is characteristically referred to as the cohort survival method. In this procedure, ratios are computed between the enrollment of one grade-level in a particular historical year and the enrollment of the previous grade-level in the prior historical year. When these ratios are computed between each pair of sequential grade-levels, they may be applied to the grade-by-grade enrollment for the most recent historical year to effectively "age" the enrollment in each grade-level through each subsequent grade-level and ultimately to graduation. The cohort survival method has been found to be a suitable mechanism for projecting primary and secondary school enrollments, where the enrollments of successive grade-levels in sequential years are characteristically composed largely of the same individuals. Because the enrollments also encompass the net effect of migration, the use of the method also takes into account population trends applicable to an area.

For the specific application, cohort survival rates were computed between each pair of grade-levels between grade one and graduation for the combined public and private primary and secondary school enrollments of each of the sixty-seven counties in Pennsylvania, utilizing the data collected and made available by the Division of Educational Statistics of the Pennsylvania Department of Education. (4) Rates were computed between each pair of sequential years between 1968 and 1972 with the average of the three values in closest agreement adopted for projection application. These rates were then used in

conjunction with the grade-by-grade enrollments reported for each county in the Fall of 1972 to develop projections of high school graduates in accord with the following relationship:

$$D_{c,t+n} = (E_{c,t,g}) \left[(R_{c,g+1,g}) \cdots (R_{c,g+n,g+n-1})\right]$$

subject to $g+n=13$

where: $D_{c,t+n}$ = graduates in county c in projected year t+n

$E_{c,t,g}$ = enrollment in county c in most recent historical year t in grade-level g

$R_{c,g+1,g}$ = cohort survival rate in county c from grade-level g to grade-level g+1.

The projections of graduates by county for each year were then normalized in relation to the state-wide projection of graduates for each year. For 1973 through 1982, the preliminary state-wide projections developed by the Division of Educational Statistics were employed; for 1983 and 1984, projections based on live births were used for this purpose.[2] This normalization procedure was employed in order to take into account the longer-term assessment of the trends of cohort survival rates, conducted on a state-wide basis by the Division of Educational Statistics, than was possible on a county by county basis. It is of note, however, that the normalization process had an average effect of only 1.2%. The normalized projections of graduates by county were calculated in accord with the following equation:

$$D^{*}_{c,t+n} = \frac{(D_{c,t+n})\ (D_{s,t+n})}{\sum_{c=1}^{c=67} D_{c,t+n}}$$

where: $D^{*}_{c,t+n}$ = normalized graduates in county c in projected year t+n

$D_{s,t+n}$ = state-wide graduates in projected year t+n.

For determining the projections of graduates from the commuting areas associated with each of the eighteen campuses, the county projections were aggregated over the counties which are defined as comprising the commuting regions associated with each campus.(3)

REFERENCES

1. Projections through 1982 from "Projections of Educational Statistics to 1981-82, U.S. Department of Health, Education, and Welfare. Projections for 1983 and 1984 developed from records of live births from "Estimates of the Population of the U.S. and Components of Change", Current Population Reports, Series P-25, No. 499, U.S. Department of Commerce.

2. Projections through 1982 from preliminary figures supplied by the Division of Educational Statistics of the Pennsylvania Department of Education. Projections for 1983 and 1984 developed from records of live births from "Pennsylvania Natality and Mortality Statistics 1970", Pennsylvania Department of Health.

3. Newton, R. D., "The Commonwealth Campuses and the Commuting Student", Office of Vice President for Planning, The Pennsylvania State University, 1970.

4. Primary and Secondary school enrollments for both public and private institutions for 1968 through 1972 from "Our Schools Today"; Vol. 8, No. 1, 3, and 4; Vol. 9, No. 1, 3, and 4; Vol. 10, No. 1, 3 and 4; Vol. 11, No. 1, 3, and 4; Vol. 12, No. 1 and 4; Division of Educational Statistics, Pennsylvania Department of Education.